



#8

SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT: RABIN, Mark B.

(ii) TITLE OF INVENTION: MUTATIONS IN THE BRCA1 GENE

(iii) NUMBER OF SEQUENCES: 10

(iv) CORRESPONDENCE ADDRESS:

- (A) ADDRESSEE: Morgan, Lewis & Bockius LLP
- (B) STREET: 1111 Pennsylvania Avenue, N.W.
- (C) CITY: Washington
- (D) STATE: DC
- (E) COUNTRY: USA
- (F) ZIP: 20004

(v) COMPUTER READABLE FORM:

- (A) MEDIUM TYPE: Diskette
- (B) COMPUTER: IBM Compatible
- (C) OPERATING SYSTEM: Windows
- (D) SOFTWARE: FastSEQ for Windows Version 2.0b

(vi) CURRENT APPLICATION DATA:

- (A) APPLICATION NUMBER: US 09/982,835
- (B) FILING DATE: 2001-10-22

(vii) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: US 09/038,946
- (B) FILING DATE: 1998-03-12

(viii) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: US 09/697,149
- (B) FILING DATE: 2000-10-27

(ix) ATTORNEY/AGENT INFORMATION:

- (A) NAME: Michael S. Tuscan, Ph.D.
- (B) REGISTRATION NUMBER: 43,210
- (C) REFERENCE/DOCKET NUMBER: 44921-5047-02-US

(x) TELECOMMUNICATION INFORMATION:

- (A) TELEPHONE: 202-739-3000
- (B) TELEFAX: 202-739-3001

(2) INFORMATION FOR SEQ ID NO:1:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 5710 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

RECEIVED

JUN 19 2002

TECH CENTER 1600/2900

AGCTCGCTGA	GACTTCCTGG	ACCCCGCACC	AGGCTGTGGG	GTTTCTCAGA	TAACTGGGCC	60
CCTCGCTCA	GGAGGCCTTC	ACCCTCTGCT	CTGGGTAAAG	TTCATTGGAA	CAGAAAGAAA	120
TGGATTTATC	TGCTCTTCGC	GTTGAAGAAG	TACAAAATGT	CATTAATGCT	ATGCAGAAAA	180
TCTTAGAGTG	TCCCATCTGT	CTGGAGTTGA	TCAAGGAACC	TGTCTCCACA	AAGTGTGACC	240
ACATATTTTG	CAAATTTGCA	ATGCTGAAAC	TTCTCAACCA	GAAGAAAGGG	CCTTCACAGT	300
GTCCTTTATG	TAAGAATGAT	ATAACCAAAA	GGAGCCTACA	AGAAAGTACG	AGATTTAGTC	360
AACTTGTGTA	AGAGCTATTG	AAAATCATTT	GTGCTTTCA	GCTTGACACA	GGTTTGGAGT	420
ATGCAAACAG	CTATAATTTC	GCAAAAAAAGG	AAAATAACTC	TCCTGAACAT	CTAAAAGATG	480
AAGTTTCTAT	CATCCAAAGT	ATGGGCTACA	GAACCGTGC	CAAAGACTT	CTACAGAGTG	540
AACCCGAAAA	TCCTTCCTTG	CAGGAAACCA	GTCTCAGTGT	CCAACTCTCT	AACCTTGGAA	600
CTGTGAGAAC	TCTGAGGACA	AAGCAGCGGA	TACAACCTCA	AAAGACGTCT	GTCTACATTG	660
AATTGGGATC	TGATTCCTCT	GAAGATACCG	TTAATAAGGC	AACTTATTGC	AGTGTGGGAG	720
ATCAAGAATT	GTTACAAATC	ACCCCTCAAG	GAACCGAGGA	TGAAATCAGT	TTGGATTCTG	780
CAAAAAAAGG	TGCTTGTGAA	TTTTCTGAGA	CGGATGTAAC	AAATACTGAA	CATCATCAAC	840
CCAGTAATAA	TGATTTGAAC	ACCACTGAGA	AGCGTGCAGC	TGAGAGGCAT	CCAGAAAAGT	900
ATCAGGGTAG	TTCTGTTTC	AACTTGCATG	TGGAGCCATG	TGGCACAAAT	ACTCATGCCA	960
GCTCATTACA	GCATGAGAAC	AGCAGTTAT	TACTCACTAA	AGACAGAAATG	AATGTAGAAA	1020
AGGCTGAATT	CTGTAATAAA	AGCAAACAGC	CTGGCTTAGC	AAGGAGCCAA	CATAACAGAT	1080
GGGCTGGAAG	TAAGGAAACA	TGTAATGATA	GGCGGACTCC	CAGCACAGAA	AAAAAGGTAG	1140
ATCTGAATGC	TGATCCCTG	TGTGAGAGAA	AAGAATGGAA	TAAGCAGAAA	CTGCCATGCT	1200
CAGAGAATCC	TAGAGATACT	GAAGATGTTG	CTTGGATAAC	ACTAAATAGC	AGCATTCAAGA	1260
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GGGAGCTGTA	ATCAAATGCC	AAAGTAGCTG	ATGTATTGGA	CGTTCTAAAT	GAGGTAGATG	1380
AATATTCTGG	TTCTTCAGAG	AAAATAGACT	TACTGGCCAG	TGATCCTCAT	GAGGCTTTAA	1440
TATGAAAAG	TGAAAGAGTT	CACTCCAAT	CAGTAGAGAG	TAATATTGAA	GACAAAATAT	1500
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AATTAAAGCG	TAAAAGGAGA	CCTACATCAG	GCCTTCATCC	TGAGGATTTT	ATCAAGAAAG	1680
CAGATTTGGC	AGTTCAAAAG	ACTCCTGAAA	TGATAATCA	GGGAACTAAC	CAAACGGGAGC	1740
AGAATGGTCA	AGTGTATGAT	ATTACTATA	GTGGTCATGA	GAATAAAACA	AAAGGTGATT	1800
CTATTCAAGAA	TGAGAAAAAT	CCTAACCCAA	TAGAATCACT	CGAAAAAGAA	TCTGCTTTCA	1860
AAACGAAAGC	TGAACCTATA	AGCAGCAGTA	TAAGCAATAT	GGAACTCGAA	TTAAATATCC	1920
ACAATTCAAA	AGCACCTAAA	AAGAATAGGC	TGAGGAGGAA	GTCTTCTACC	AGGCATATTG	1980
ATGCGCTTGA	ACTAGTAGTC	AGTAGAAATC	TAAGCCCACC	TAATTGTACT	GAATTGCAAA	2040
TTGATAGTTG	TTCTAGCAGT	GAAGAGATAA	AGAAAAAAA	GTACAACCAA	ATGCCAGTCA	2100
GGCACAGCAG	AAACCTACAA	CTCATGGAAG	GTAAAGAACCC	TGCAACTGGA	GCCAAGAAGA	2160
GTAACAAGCC	AAATGAACAG	ACAAGTAAA	GACATGACAG	TGATACCTTC	CCAGAGCTGA	2220
AGTTAACAAA	TGCACCTGGT	TCTTTTACTA	AGTGTTCAAA	TACCACTGAA	CTTAAAGAAT	2280
TTGTCATCC	TAGCCTTCCA	AGAGAAGAAA	AAGAAGAGAA	ACTAGAAACA	GTAAAGTGT	2340
CTAATAATGC	TGAAGACCCC	AAAGATCTCA	TGTTAAGTGG	AGAAAGGGTT	TTGCAAACCTG	2400
AAAGATCTGT	AGAGAGTAGC	AGTATTTCAC	TGGTACCTGG	TACTGATTAT	GGCACTCAGG	2460
AAAGTATCTC	GTTACTGGAA	GTTAGCACTC	TAGGGAAGGC	AAAAACAGAA	CCAAATAAAT	2520
GTGTGAGTCA	GTGTGCAAGCA	TTTGAAAACC	CCAAGGGACT	AATTCACTGGT	TGTTCCAAAG	2580
ATAATAGAAA	TGACACAGAA	GGCTTTAAGT	ATCCATTGGG	ACATGAAGTT	AACCACAGTC	2640
GGGAAACAAG	CATAGAAATG	GAAGAAAGTG	AACTTGATGC	TCAGTATTTG	CAGAATACAT	2700
TCAAGGTTTC	AAAGGCCAG	TCATTTGCTC	TGTTTCAAA	TCCAGGAAAT	GCAGAAGAGG	2760
AATGTGCAAC	ATTCTCTGCC	CACTCTGGGT	CCTTAAAGAA	ACAAAGTCCA	AAAGTCACTT	2820
TTGAATGTGA	ACAAAAGGAA	GAAAATCAAG	GAAAGAAATGA	GTCTAATATC	AAGCCTGTAC	2880
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ATGCCAAATG	TAGTATCAAA	GGAGGCTCTA	GGTTTGTCT	ATCATCTCAG	TTCAAGAGGC	3000
ACGAAACTGG	ACTCATTACT	CCAAATAAAC	ATGGACTTTT	ACAAAACCCA	TATCGTATAC	3060
CACCACTTTT	TCCCCTCAAG	TCATTGTTA	AAACTAAATG	TAAGAAAAAT	CTGCTAGAGG	3120
AAAACTTGAA	GGAACATTCA	ATGTCACCTG	AAAGAGAAAT	GGGAAATGAG	AACATTCCAA	3180
GTACAGTGTAG	CACAATTAGC	CGTAATAACA	TTAGAGAAAA	TGTTTAAAG	GGAGCCAGCT	3240
CAAGCAATAT	TAATGAAGTA	GGTTCCAGTA	CTAATGAAGT	GGGCTCCAGT	ATTAATGAAA	3300
TAGGTTCCAG	TGATGAAAC	ATTCAAGCAG	AACTAGGTAG	AAACAGAGGG	CCAAATTGAA	3360

ATGCTATGCT	TAGATTAGGG	GTTTGCAAC	CTGAGGTCTA	TAAACAAAGT	CTTCCTGGAA	3420
GTAATTGTAA	GCATCCTGAA	ATAAAAAGC	AAGAATATGA	AGAAGTAGTT	CAGACTGTTA	3480
ATACAGATT	CTCTCCATAT	CTGATTCAG	ATAACTTACA	ACAGCCTATG	GGAAGTAGTC	3540
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AAGATACTAG	TTTGCTGAA	AATGACATTA	AGGAAAGTTC	TGCTGTTTT	AGCAAAAGCG	3660
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GTTACCGAAG	AGGGGCCAAG	AAATTAGAGT	CCTCAGAAGA	GAACTTATCT	AGTGAGGATG	3780
AAGAGCTTCC	CTGCTTCCAA	CACTTGTAT	TTGGTAAAGT	AAACAATATA	CCTTCTCAGT	3840
CTACTAGGCA	TAGCACCGTT	GCTACCGAGT	GTCTGTCTAA	GAACACAGAG	GAGAATTAT	3900
TATCATGAA	GAATAGCTTA	AATGACTGCA	GTAACCAGGT	AATATTGGCA	AAGGCATCTC	3960
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GTGAATTGGA	AGACTTGACT	GCAAATACAA	ACACCCAGGA	TCCTTCTTG	ATTGGTTCTT	4080
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TTTCAGATGA	TGAAGAAAGA	GGAACGGGCT	TGGAAGAAAA	TAATCAAGAA	GAGCAAAGCA	4200
TGGATTCAA	CTTAGGTGAA	GCAGCATCTG	GGTGTGAGAG	TGAAACAAGC	GTCTCTGAAG	4260
ACTGCTCAGG	GCTATCCTCT	CAGAGTGACA	TTTTAACAC	TCAGCAGAGG	GATACCATGC	4320
AAACATAACCT	GATAAACGTC	CAGCAGGAAA	TGGCTGAAC	AGAAGCTGTG	TTAGAACAGC	4380
ATGGGAGCCA	CCCTTCTAAC	AGCTACCCCT	CCATCATAAG	TGACTCCTCT	GCCCTTGAGG	4440
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GTGAATAACCC	TATAAGCCAG	AATCCAGAAG	GCCTTTCTGC	TGACAAGTTT	GAGGTGTCG	4560
CAGATAGTTC	TACCAAGTAA	AATAAAAGAAC	CAGGAGTGG	AAGGTCACTC	CCTTCTAAAT	4620
GCCCCATCATT	AGATGATAGG	TGGTACATGC	ACAGTTGCTC	TGGGAGTCCT	CAGAATAGAA	4680
ACTACCCATC	TCAAGAGGAG	CTCATTAAGG	TTGTTGATGT	GGAGGAGCAA	CAGCTGGAAG	4740
AGTCTGGGCC	ACACGATTTG	ACGGAAACAT	CTTACTTGCC	AAGGCAAGAT	CTAGAGGGAA	4800
CCCCTTACCT	CGAATCTGG	ATCAGCCTCT	TCTCTGATGA	CCCTGAAATCT	GATCCTCTG	4860
AAGACAGAGC	CCCAGACTCA	GCTCGTGTG	GCAACATACC	ATCTCAACC	TCTGCATTGA	4920
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ATACTGCTGG	GTATAATGCA	ATGGAAGAAA	GTGTGAGCAG	GGAGAAGCCA	GAATTGACAG	5040
CTTCAACAGA	AAGGGTCAAC	AAAAGAATGT	CCATGGTGGT	GTCTGGCTG	ACCCCAGAAG	5100
AATTATGCT	CGTGTACAAG	TTTGCAGAA	AACACCACAT	CACTTTAACT	AATCTAATTA	5160
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TGAAAATATT	TCTAGGAATT	GCGGGAGGAA	AATGGGTAGT	TAGCTATTTC	TGGGTGACCC	5280
AGTCTATTAA	AGAAAAGAAAA	ATGCTGAATG	AGCATGATT	TGAAGTCAGA	GGAGATGTGG	5340
TCAATGGAAG	AAACCACCAA	GGTCCAAAGC	GAGCAAGAGA	ATCCCAAGAC	AGAAAGATCT	5400
TCAGGGGGCT	AGAAAATCTGT	TGCTATGGGC	CCTTCACCAA	CATGCCACAA	GATCAACTGG	5460
AATGGATGGT	ACAGCTGTGT	GGTGCTTCTG	GGTGAAGGA	GCTTTCATCA	TTCACCCCTG	5520
GCACAGGGTGT	CCACCCAATT	GTGGTGTGTC	AGCCAGATGC	CTGGACAGAG	GACAATGGCT	5580
TCCATGCAAT	TGGGCAGATG	TGTGAGGCAC	CTGTGGTGAC	CCGAGAGTGG	GTGTTGGACA	5640
GTGTAGCACT	CTACCACTG	CAGGAGCTGG	ACACCTACCT	GATACCCCA	ATCCCCACAA	5700
GCCACTACTG	A					5710

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1863 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

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Met Asp Leu Ser Ala Leu Arg Val Glu Glu Val Gln Asn Val Ile Asn
      1           5           10          15
Ala Met Gln Lys Ile Leu Glu Cys Pro Ile Cys Leu Glu Leu Ile Lys
      20          25          30

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Glu Pro Val Ser Thr Lys Cys Asp His Ile Phe Cys Lys Phe Cys Met
 35 40 45
 Leu Lys Leu Leu Asn Gln Lys Lys Gly Pro Ser Gln Cys Pro Leu Cys
 50 55 60
 Lys Asn Asp Ile Thr Lys Arg Ser Leu Gln Glu Ser Thr Arg Phe Ser
 65 70 75 80
 Gln Leu Val Glu Glu Leu Leu Lys Ile Ile Cys Ala Phe Gln Leu Asp
 85 90 95
 Thr Gly Leu Glu Tyr Ala Asn Ser Tyr Asn Phe Ala Lys Lys Glu Asn
 100 105 110
 Asn Ser Pro Glu His Leu Lys Asp Glu Val Ser Ile Ile Gln Ser Met
 115 120 125
 Gly Tyr Arg Asn Arg Ala Lys Arg Leu Leu Gln Ser Glu Pro Glu Asn
 130 135 140
 Pro Ser Leu Gln Glu Thr Ser Leu Ser Val Gln Leu Ser Asn Leu Gly
 145 150 155 160
 Thr Val Arg Thr Leu Arg Thr Lys Gln Arg Ile Gln Pro Gln Lys Thr
 165 170 175
 Ser Val Tyr Ile Glu Leu Gly Ser Asp Ser Ser Glu Asp Thr Val Asn
 180 185 190
 Lys Ala Thr Tyr Cys Ser Val Gly Asp Gln Glu Leu Leu Gln Ile Thr
 195 200 205
 Pro Gln Gly Thr Arg Asp Glu Ile Ser Leu Asp Ser Ala Lys Lys Ala
 210 215 220
 Ala Cys Glu Phe Ser Glu Thr Asp Val Thr Asn Thr Glu His His Gln
 225 230 235 240
 Pro Ser Asn Asn Asp Leu Asn Thr Thr Glu Lys Arg Ala Ala Glu Arg
 245 250 255
 His Pro Glu Lys Tyr Gln Gly Ser Ser Val Ser Asn Leu His Val Glu
 260 265 270
 Pro Cys Gly Thr Asn Thr His Ala Ser Ser Leu Gln His Glu Asn Ser
 275 280 285
 Ser Leu Leu Leu Thr Lys Asp Arg Met Asn Val Glu Lys Ala Glu Phe
 290 295 300
 Cys Asn Lys Ser Lys Gln Pro Gly Leu Ala Arg Ser Gln His Asn Arg
 305 310 315 320
 Trp Ala Gly Ser Lys Glu Thr Cys Asn Asp Arg Arg Thr Pro Ser Thr
 325 330 335
 Glu Lys Lys Val Asp Leu Asn Ala Asp Pro Leu Cys Glu Arg Lys Glu
 340 345 350
 Trp Asn Lys Gln Lys Leu Pro Cys Ser Glu Asn Pro Arg Asp Thr Glu
 355 360 365
 Asp Val Pro Trp Ile Thr Leu Asn Ser Ser Ile Gln Lys Val Asn Glu
 370 375 380
 Trp Phe Ser Arg Ser Asp Glu Leu Leu Gly Ser Asp Asp Ser His Asp
 385 390 395 400
 Gly Glu Ser Glu Ser Asn Ala Lys Val Ala Asp Val Leu Asp Val Leu
 405 410 415
 Asn Glu Val Asp Glu Tyr Ser Gly Ser Ser Glu Lys Ile Asp Leu Leu
 420 425 430
 Ala Ser Asp Pro His Glu Ala Leu Ile Cys Lys Ser Glu Arg Val His
 435 440 445
 Ser Lys Ser Val Glu Ser Asn Ile Glu Asp Lys Ile Phe Gly Lys Thr
 450 455 460
 Tyr Arg Lys Lys Ala Ser Leu Pro Asn Leu Ser His Val Thr Glu Asn
 465 470 475 480
 Leu Ile Ile Gly Ala Phe Val Thr Glu Pro Gln Ile Ile Gln Glu Arg

485	490	495
Pro Leu Thr Asn Lys Leu Lys Arg Lys	Arg Arg Pro Thr Ser Gly	Leu
500	505	510
His Pro Glu Asp Phe Ile Lys Lys Ala Asp Leu Ala Val Gln Lys Thr		
515	520	525
Pro Glu Met Ile Asn Gln Gly Thr Asn Gln Thr Glu Gln Asn Gly Gln		
530	535	540
Val Met Asn Ile Thr Asn Ser Gly His Glu Asn Lys Thr Lys Gly Asp		
545	550	555
Ser Ile Gln Asn Glu Lys Asn Pro Asn Pro Ile Glu Ser Leu Glu Lys		
565	570	575
Glu Ser Ala Phe Lys Thr Lys Ala Glu Pro Ile Ser Ser Ser Ile Ser		
580	585	590
Asn Met Glu Leu Glu Leu Asn Ile His Asn Ser Lys Ala Pro Lys Lys		
595	600	605
Asn Arg Leu Arg Arg Lys Ser Ser Thr Arg His Ile His Ala Leu Glu		
610	615	620
Leu Val Val Ser Arg Asn Leu Ser Pro Pro Asn Cys Thr Glu Leu Gln		
625	630	635
Ile Asp Ser Cys Ser Ser Ser Glu Glu Ile Lys Lys Lys Lys Tyr Asn		
645	650	655
Gln Met Pro Val Arg His Ser Arg Asn Leu Gln Leu Met Glu Gly Lys		
660	665	670
Glu Pro Ala Thr Gly Ala Lys Lys Ser Asn Lys Pro Asn Glu Gln Thr		
675	680	685
Ser Lys Arg His Asp Ser Asp Thr Phe Pro Glu Leu Lys Leu Thr Asn		
690	695	700
Ala Pro Gly Ser Phe Thr Lys Cys Ser Asn Thr Ser Glu Leu Lys Glu		
705	710	715
Phe Val Asn Pro Ser Leu Pro Arg Glu Glu Lys Glu Glu Lys Leu Glu		
725	730	735
Thr Val Lys Val Ser Asn Asn Ala Glu Asp Pro Lys Asp Leu Met Leu		
740	745	750
Ser Gly Glu Arg Val Leu Gln Thr Glu Arg Ser Val Glu Ser Ser Ser		
755	760	765
Ile Ser Leu Val Pro Gly Thr Asp Tyr Gly Thr Gln Glu Ser Ile Ser		
770	775	780
Leu Leu Glu Val Ser Thr Leu Gly Lys Ala Lys Thr Glu Pro Asn Lys		
785	790	795
Cys Val Ser Gln Cys Ala Ala Phe Glu Asn Pro Lys Gly Leu Ile His		
805	810	815
Gly Cys Ser Lys Asp Asn Arg Asn Asp Thr Glu Gly Phe Lys Tyr Pro		
820	825	830
Leu Gly His Glu Val Asn His Ser Arg Glu Thr Ser Ile Glu Met Glu		
835	840	845
Glu Ser Glu Leu Asp Ala Gln Tyr Leu Gln Asn Thr Phe Lys Val Ser		
850	855	860
Lys Arg Gln Ser Phe Ala Leu Phe Ser Asn Pro Gly Asn Ala Glu Glu		
865	870	875
Glu Cys Ala Thr Phe Ser Ala His Ser Gly Ser Leu Lys Lys Gln Ser		
885	890	895
Pro Lys Val Thr Phe Glu Cys Glu Gln Lys Glu Glu Asn Gln Gly Lys		
900	905	910
Asn Glu Ser Asn Ile Lys Pro Val Gln Thr Val Asn Ile Thr Ala Gly		
915	920	925
Phe Pro Val Val Gly Gln Lys Asp Lys Pro Val Asp Asn Ala Lys Cys		
930	935	940

Ser Ile Lys Gly Gly Ser Arg Phe Cys Leu Ser Ser Gln Phe Arg Gly
 945 950 955 960
 Asn Glu Thr Gly Leu Ile Thr Pro Asn Lys His Gly Leu Leu Gln Asn
 965 970 975
 Pro Tyr Arg Ile Pro Pro Leu Phe Pro Ile Lys Ser Phe Val Lys Thr
 980 985 990
 Lys Cys Lys Lys Asn Leu Leu Glu Glu Asn Phe Glu Glu His Ser Met
 995 1000 1005
 Ser Pro Glu Arg Glu Met Gly Asn Glu Asn Ile Pro Ser Thr Val Ser
 1010 1015 1020
 Thr Ile Ser Arg Asn Asn Ile Arg Glu Asn Val Phe Lys Gly Ala Ser
 1025 1030 1035 104
 Ser Ser Asn Ile Asn Glu Val Gly Ser Ser Thr Asn Glu Val Gly Ser
 1045 1050 1055
 Ser Ile Asn Glu Ile Gly Ser Ser Asp Glu Asn Ile Gln Ala Glu Leu
 1060 1065 1070
 Gly Arg Asn Arg Gly Pro Lys Leu Asn Ala Met Leu Arg Leu Gly Val
 1075 1080 1085
 Leu Gln Pro Glu Val Tyr Lys Gln Ser Leu Pro Gly Ser Asn Cys Lys
 1090 1095 1100
 His Pro Glu Ile Lys Lys Glu Tyr Glu Glu Val Val Gln Thr Val
 1105 1110 1115 112
 Asn Thr Asp Phe Ser Pro Tyr Leu Ile Ser Asp Asn Leu Glu Gln Pro
 1125 1130 1135
 Met Gly Ser Ser His Ala Ser Gln Val Cys Ser Glu Thr Pro Asp Asp
 1140 1145 1150
 Leu Leu Asp Asp Gly Glu Ile Lys Glu Asp Thr Ser Phe Ala Glu Asn
 1155 1160 1165
 Asp Ile Lys Glu Ser Ser Ala Val Phe Ser Lys Ser Val Gln Arg Gly
 1170 1175 1180
 Glu Leu Ser Arg Ser Pro Ser Pro Phe Thr His Thr His Leu Ala Gln
 1185 1190 1195 120
 Gly Tyr Arg Arg Gly Ala Lys Lys Leu Glu Ser Ser Glu Glu Asn Leu
 1205 1210 1215
 Ser Ser Glu Asp Glu Glu Leu Pro Cys Phe Gln His Leu Leu Phe Gly
 1220 1225 1230
 Lys Val Asn Asn Ile Pro Ser Gln Ser Thr Arg His Ser Thr Val Ala
 1235 1240 1245
 Thr Glu Cys Leu Ser Lys Asn Thr Glu Glu Asn Leu Leu Ser Leu Lys
 1250 1255 1260
 Asn Ser Leu Asn Asp Cys Ser Asn Gln Val Ile Leu Ala Lys Ala Ser
 1265 1270 1275 128
 Gln Glu His His Leu Ser Glu Glu Thr Lys Cys Ser Ala Ser Leu Phe
 1285 1290 1295
 Ser Ser Gln Cys Ser Glu Leu Glu Asp Leu Thr Ala Asn Thr Asn Thr
 1300 1305 1310
 Gln Asp Pro Phe Leu Ile Gly Ser Ser Lys Gln Met Arg His Gln Ser
 1315 1320 1325
 Glu Ser Gln Gly Val Gly Leu Ser Asp Lys Glu Leu Val Ser Asp Asp
 1330 1335 1340
 Glu Glu Arg Gly Thr Gly Leu Glu Glu Asn Asn Gln Glu Glu Gln Ser
 1345 1350 1355 136
 Met Asp Ser Asn Leu Gly Glu Ala Ala Ser Gly Cys Glu Ser Glu Thr
 1365 1370 1375
 Ser Val Ser Glu Asp Cys Ser Gly Leu Ser Ser Gln Ser Asp Ile Leu
 1380 1385 1390
 Thr Thr Gln Gln Arg Asp Thr Met Gln His Asn Leu Ile Lys Leu Gln

1395	1400	1405
Gln Glu Met Ala Glu Leu Glu Ala Val Leu Glu Gln His Gly Ser Gln		
1410	1415	1420
Pro Ser Asn Ser Tyr Pro Ser Ile Ile Ser Asp Ser Ser Ala Leu Glu		
1425	1430	1435
144		
Asp Leu Arg Asn Pro Glu Gln Ser Thr Ser Glu Lys Ala Val Leu Thr		
1445	1450	1455
Ser Gln Lys Ser Ser Glu Tyr Pro Ile Ser Gln Asn Pro Glu Gly Leu		
1460	1465	1470
Ser Ala Asp Lys Phe Glu Val Ser Ala Asp Ser Ser Thr Ser Lys Asn		
1475	1480	1485
Lys Glu Pro Gly Val Glu Arg Ser Ser Pro Ser Lys Cys Pro Ser Leu		
1490	1495	1500
Asp Asp Arg Trp Tyr Met His Ser Cys Ser Gly Ser Leu Gln Asn Arg		
1505	1510	1515
152		
Asn Tyr Pro Ser Gln Glu Glu Leu Ile Lys Val Val Asp Val Glu Glu		
1525	1530	1535
Gln Gln Leu Glu Ser Gly Pro His Asp Leu Thr Glu Thr Ser Tyr		
1540	1545	1550
Leu Pro Arg Gln Asp Leu Glu Gly Thr Pro Tyr Leu Glu Ser Gly Ile		
1555	1560	1565
Ser Leu Phe Ser Asp Asp Pro Glu Ser Asp Pro Ser Glu Asp Arg Ala		
1570	1575	1580
Pro Glu Ser Ala Arg Val Gly Asn Ile Pro Ser Ser Thr Ser Ala Leu		
1585	1590	1595
160		
Lys Val Pro Gln Leu Lys Val Ala Glu Ser Ala Gln Gly Pro Ala Ala		
1605	1610	1615
Ala His Thr Thr Asp Thr Ala Gly Tyr Asn Ala Met Glu Glu Ser Val		
1620	1625	1630
Ser Arg Glu Lys Pro Glu Leu Thr Ala Ser Thr Glu Arg Val Asn Lys		
1635	1640	1645
Arg Met Ser Met Val Val Ser Gly Leu Thr Pro Glu Glu Phe Met Leu		
1650	1655	1660
Val Tyr Lys Phe Ala Arg Lys His His Ile Thr Leu Thr Asn Leu Ile		
1665	1670	1675
168		
Thr Glu Glu Thr Thr His Val Val Met Lys Thr Asp Ala Glu Phe Val		
1685	1690	1695
Cys Glu Arg Thr Leu Lys Tyr Phe Leu Gly Ile Ala Gly Gly Lys Trp		
1700	1705	1710
Val Val Ser Tyr Phe Trp Val Thr Gln Ser Ile Lys Glu Arg Lys Met		
1715	1720	1725
Leu Asn Glu His Asp Phe Glu Val Arg Gly Asp Val Val Asn Gly Arg		
1730	1735	1740
Asn His Gln Gly Pro Lys Arg Ala Arg Glu Ser Gln Asp Arg Lys Ile		
1745	1750	1755
176		
Phe Arg Gly Leu Glu Ile Cys Cys Tyr Gly Pro Phe Thr Asn Met Pro		
1765	1770	1775
Thr Asp Gln Leu Glu Trp Met Val Gln Leu Cys Gly Ala Ser Val Val		
1780	1785	1790
Lys Glu Leu Ser Ser Phe Thr Leu Gly Thr Gly Val His Pro Ile Val		
1795	1800	1805
Val Val Gln Pro Asp Ala Trp Thr Glu Asp Asn Gly Phe His Ala Ile		
1810	1815	1820
Gly Gln Met Cys Glu Ala Pro Val Val Thr Arg Glu Trp Val Leu Asp		
1825	1830	1835
184		
Ser Val Ala Leu Tyr Gln Cys Gln Glu Leu Asp Thr Tyr Leu Ile Pro		
1845	1850	1855

Gln Ile Pro His Ser His Tyr
1860

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

AATCTTAGAG TGTCCA

17

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

ATCTTAGTGT CCCACCT

17

(2) INFORMATION FOR SEQ ID NO:5:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

CAGAAAAAAA GGTAGAT

17

(2) INFORMATION FOR SEQ ID NO:6:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

CAGAAAAAAA AGGTAGA

17

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

AGAGAATCCC AGGACAG

17

(2) INFORMATION FOR SEQ ID NO:8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

AGAGAATCCC CAGGACA

17

(2) INFORMATION FOR SEQ ID NO:9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

AGGACCTGCG AAATCCA

17

(2) INFORMATION FOR SEQ ID NO:10:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

AGGACCTGTG AAATCCA

17